TDS
TECHNICAL DATA SHEET

BioPoxy® 36

DESCRIPTION

BioPoxy® 36 is a two-component epoxy system developed for open mold lamination. The system cures at room temperature and is suitable for manufacturing composite parts and non-critical structures using a wet layup fabrication method.

BioPoxy® 36 will wet out and bond to fiberglass, carbon fiber, and natural fiber reinforcements. Used as directed with EcoPoxy's GelCoat, BioPoxy® 36 is part of a complete system for composites fabrication.

EcoPoxy is committed to creating 100% solids epoxy systems made with high bio-based carbon content materials that deliver exceptional results.

KEY FEATURES

- Significant bio-based carbon content
- Designed for wet layup
- Room temperature cure
- Inherent chemical resistance
- Easy mix ratio
- Designed for use with EcoPoxy GelCoat
- Compatible with fiberglass, carbon fiber, and natural fibers
- Low odor, low VOC
- High adhesion

PRODUCT TECHNICAL DATA

PHYSICAL PROPERTIES

The table below summarizes physical properties of liquid BioPoxy® 36 such as appearance, bio-based carbon content, and specific gravity.

PHYSICAL PROPERTIES (LIQUID)		
Appearance: Part A	Visual observation	Slightly yellow
Appearance: Part B	Visual observation	Amber/orange
System Bio-based Carbon Content	ASTM D6866	32%
Specific Gravity: Part A at 22°C	ASTM D1475	1.126
Specific Gravity: Part B at 22°C	ASTM D1475	1.050

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MIXING

BioPoxy® 36 is formulated to have a 4:1 resin to hardener mix ratio by volume. Deviation from the mix ratio can result in lower mechanical properties or incomplete cure.

MIXING	
Mix ratio by volume	4:1
Mix ratio by mass	4.3:1

VISCOSITY

Viscosity indicates the material's resistance to flow. Viscosity measurements of resin systems vary during the curing process, first decreasing as the mixture heats up, then increasing as the mixture approaches gelation. Reported initial mixed viscosity can be dependent on the temperature of the resin components, and the temperature of the environment.

VISCOSITY		
Viscosity: Part A at 22°C	ASTM D2196	1,440 cP
Viscosity: Part B at 22°C	ASTM D2196	530 cP
Initial Mixed Viscosity at 22°C	ASTM D2196	1,030 cP

REACTIVITY

BioPoxy® 36 is a thermosetting resin and will generate heat as it cures. **Reactivity level** is a qualitative indicator of the rate of reaction and temperature of the resin system's cure. **Gel time** is the point at which the mixed resin gels or becomes so viscous that it can no longer be worked. **Peak exotherm** is the maximum temperature observed during cure, and **Time to peak exotherm** is the length of time between initial mixing and observation of the peak exotherm temperature. The reactivity of the resin system can be affected by factors such as part thickness, the temperature of resin and hardener before mixing, ambient conditions, and the ability of the mold to release heat.

REACTIVITY	
Reactivity Level	Moderate
Gel Time (100 g)	20 min
Peak Exotherm Temperature	188°C (370°F)
Time to Peak Exotherm	23 min

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PROCESSING CHARACTERISTICS

Working time is the time during which the resin has been mixed and can still be manipulated with a brush or roller.

Tacky to touch is the period where a second laminate schedule can be applied without the need to abrade the surface of the first layer for adhesion. After lightly touching the surface of the laminate, a glove print remains; resin does not stick to the glove and the surface does not significantly deform.

Set to touch is the point in time immediately after the tacky to touch period, where the surface of the laminate is tack-free. Using the same method as tacky to touch, no glove print should remain after lightly touching the surface of the laminate. Laminating a second schedule is not recommended without abrading the surface of the first layer.

Demolding time is the point in time at which the laminate has cured sufficiently such that the mold is no longer required to hold part's shape. Laminates can be demolded when a wedge can be inserted under one corner of the laminate with no observable deformation once the wedge is removed.

Full cure is the point in time when the laminate achieves full mechanical properties.

The table below shows Working Time, Tacky to Touch, Set to Touch, Demolding Time and Full Cure for a 11" x 11" x 1/8" thick laminate. Processing characteristics will vary depending on factors such as part thickness, part geometry, ambient conditions, and mold materials.

PROCESSING CHARACTERISTICS	
Working Time Limit	30 – 40 min
Tacky to Touch Period	1.5 – 3 hours
Set to Touch	3 hours
Demolding Time	6 hours
Full Cure	7 days

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CURED RESIN PROPERTIES

Density is a measure of the degree of compactness of a substance. It is expressed as a mass per unit of volume.

Tensile Strength, Tensile Modulus and **Elongation at Break** are properties of the cured resin when subjected to a tensile or pulling force. Expressed as a force per unit area, **Tensile Modulus** is the resin's resistance to deformation (or elongation) when pulled. For a given applied force, a higher modulus material will stretch less relative to a lower modulus material. The maximum force per unit area tolerated by the cured resin is **Tensile Strength**, and the **Elongation at Break** is the percent increase in length relative to the original length at the time the test specimen fails.

Flexural Strength and **Flexural Modulus** are properties of the cured resin when subjected to a bending force. **Flexural Modulus** refers to the cured resin's resistance to bending when a force is applied. For a given applied force, a higher modulus material will bend less relative to a lower modulus material. **Flexural Strength** is the maximum force per unit area tolerated by the cured resin.

Compressive Strength is the maximum compressive force per unit area tolerated by the cured resin system.

Notched Impact Strength is the impact energy per unit area required to cleave a notched test specimen. **Notched Impact Resistance** is the impact energy per unit length required to cleave a notched test specimen of a normalized width. Parts made of resins with high impact properties show increased toughness relative to resins with lower impact properties.

Shore D Hardness is a measure of the cured resin's resistance to deformation via indentation. Resins with a higher hardness will be more resistant to scratches.

Glass Transition Temperature is the temperature at which the cured resin changes from a rigid, glassy material to a soft, non-melted material. Above the glass transition temperature, the resin may permanently deform when force is applied.

Cured resin properties were obtained for a 3mm thick cast panel, cured under ambient conditions. Tests were performed according to applicable ASTM standards. These are typical values and are provided for reference only.

CURED RESIN PROPERTIES		
Density g/cm^3 (lb/in^3)	Theoretical	1.11 (0.040)
Tensile Strength MPa (ksi)	ASTM D638	57.9 (8.4)
Tensile Modulus GPa (ksi)	ASTM D638	2.83 (411)
Elongation at Break %	ASTM D638	2.8
Flexural Strength MPa (ksi)	ASTM D790	97.1 (14.1)
Flexural Modulus GPa (ksi)	ASTM D790	2.94 (426)
Compressive Strength MPa (ksi)	ASTM D695	TBD
Notched Impact Strength kJ/m^2 (ft-lb/in^2)	ASTM D256	TBD
Notched Impact Resistance J/m (ft-lb/in)	ASTM D256	51.7 (0.97)
Shore D Hardness	ASTM D2240	70
Glass Transition Temperature Tg by DSC °C (°F)	ASTM E1356	54 (129)

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STORAGE

Store in a cool, dry, well-ventilated location out of direct sunlight. Protect from freezing and physical damage. Do not store in a location subject to frequent temperature changes as the product may crystallize. Use product as soon as possible after opening. If storing remainder of product for another project, keep container tightly closed.

STORAGE	
Ideal working temperature	22°C (72°F)
Recommended working temperature	20 - 25°C (68 - 77°F)
Recommended storage temperature	15 - 25°C (59 - 77°F)
Shelf Life	2 years; unopened

SAFETY

Consult Safety Data Sheet (SDS) before use. Wear protective gloves, clothing and eye/face protection. Use only in well ventilated areas. Avoid contact with the skin and eyes. Take off contaminated clothing and wash before reuse. Keep containers tightly sealed when not in use. Avoid breathing dust, vapors and fumes. Wash hands thoroughly after handling. During post-finishing wear proper PPE and avoid dust. When fully cured, BioPoxy® 36 is an inert plastic.

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